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COMMUNICATION FROM THE COMMISSION TO THE COUNCIL AND TO THE EUROPEAN PARLIAMENT

THE AIR TRAFFIC MANAGEMENT MASTER PLAN (THE ATM MASTER PLAN)

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(Text with EEA relevance)

1. INTRODUCTION

The ATM Master Plan provides the roadmap for the development and deployment phases of the SESAR programme which constitutes the technological pillar of the Single European Sky policy. SESAR aims at developing the new generation air traffic management system capable of ensuring safety and efficiency of air transport throughout Europe over the next 30 years.

This Communication aims first at supporting the Council's endorsement of the SESAR Master Plan as the initial ATM Master Plan. As requested by the Council, it includes an assessment of the SESAR Master Plan with a specific focus on environment and risk management[1]. This endorsement is a prerequisite to the adoption of the ATM Master Plan by the Administrative Board of the SESAR Joint Undertaking[2].

Second, recognising the ATM Master Plan as an evolving document[3], this communication presents the process for updating the ATM Master Plan. This process confirms the pivotal role of the SESAR Joint Undertaking and its Administrative board in managing the ATM Master Plan while ensuring that any significant change follows a formal process through which the Member States will continue to exercise their control[4].

2. THE ATM MASTER PLAN

2.1. Building on the SESAR definition phase

The SESAR definition phase has been co-funded by the Community and Eurocontrol. It has been carried out by the SESAR Consortium established through a contractual agreement joining the forces and expertise from all relevant ATM stakeholders. The SESAR Consortium represented a unique initiative, bringing together the best European expertise in the field of ATM.

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1 Council Resolution on SESAR development adopted on 9th October 2008, articles 5 and 9
2 Council Regulation No 219/2007 of 27 February 2007, article 5.1
3 Council Resolution on SESAR development adopted on 9th October 2008, article 6
4 Council Resolution on SESAR development adopted on 9th October 2008, article 7

The definition phase of SESAR has produced a series of deliverables setting the basis for developing and implementing the new ATM concept, addressing R&D and validation activities followed by coordinated deployment[5].

Amongst the deliverables from the SESAR definition phase, the SESAR Master Plan stands as the cornerstone, integrating the areas of performance improvements, the elements of the ATM target concept, as well as the cost benefit analysis, and laying down the roadmap for the implementation of the operational improvements into a coherent SESAR work programme. Therefore, it is the SESAR Master Plan the Commission proposes to endorse as the initial ATM Master Plan.

2.2. The SESAR Master Plan

2.2.1. Objectives

At the highest level, the SESAR Master Plan defines how to develop and deploy the new ATM system supporting the new ATM concept required to significantly contribute to the overall Single European Sky policy objectives.

2.2.2. The new ATM concept

SESAR contributions to the overall Single Sky objectives will come as the result from a completely new approach to air traffic management known as the SESAR concept of operation[6]. Key features are:

(1) **Moving from airspace to trajectory based operations**, so that each aircraft achieves its preferred route and time of arrival.

(2) **Collaborative planning** so that all parties involved in flight management from departure gate to arrival gate can plan their activities based on the performance the system will deliver[7].

(3) **Dynamic airspace management** through enhanced co-ordination between civil and military authorities.

(4) **New technologies** providing more accurate airborne navigation and optimised spacing between aircraft to maximise airspace and airports capacity. **New technologies will be embedded into a harmonised and interoperable technical architecture** whilst supporting the needs of all European regions

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5 The 6 main deliverables from the SESAR definition phase are: D1- The Air Transport Framework (ref. V3.0, July 2006); D2- The Performance Target (ref. DLM-0607-001-02-00a, December 2006); D3- The ATM Target Concept (ref. DLM-0612-001-02-00a, September 2007); D4- The Deployment Sequence (ref. DLM-0706-001-02-00, January 2008); D5- SESAR Master Plan (ref. DLM-0710-001-02-00, April 2008); D6- Work Programme for 2008-2013 (ref. DLM-0710-002-02-00, April 2008); they can be downloaded at https://www.atmmasterplan.eu

6 Concept of operation is a detailed description of how an operational concept is applied. It identifies the functions and processes, and their corresponding interactions and information flows; concerned actors, their roles and responsibilities

7 Collaborative planning will be underpinned by a System Wide Information System (SWIM) providing relevant up-to-date information to all parties involved

(5) **Central role for the human,** widely supported by advanced tools to work safely and without undue pressure.

2.2.3. The way forward: Implementation Packages and Service Levels

The SESAR Master Plan is composed of three Implementation Packages made of two Service Levels each. Annex A provides more information about Implementation Packages and Service Levels.

2.3. SESAR Master Plan assessment

The Commission considers the outcome of the SESAR definition phase as today's most reliable basis to lay down the foundations for the coming development and deployment phases of the SESAR programme.

However, the outcome of the SESAR definition phase cannot be considered as the final plan. The development phase is now taking over from the definition phase[8] and shall result in the validation of new technologies to improve performances and services, consolidating the ATM Master Plan. Therefore, the ATM Master Plan is, by nature, a living document.

The following paragraphs are aiming at providing an overview of themes which are expected to be further consolidated during the development phase.

2.3.1. Achieving societal goals

In 2005, the Commission has stated the political vision and high level goals for the Single European Sky and its technological pillar:

- Enable a 3-fold increase in capacity which will also reduce delays, both on the ground and in the air;
- Improve the safety performance by a factor of 10;
- Enable a 10% reduction in the effects flights have on the environment and;
- Provide ATM services to the airspace users at a cost of at least 50% less.

The definition phase of SESAR has concluded that ATM can significantly contribute to reaching these goals. SESAR is now targeting for 2020[9]:

- 73% increase in capacity from 2004;

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[8] According to the Council Resolution on SESAR development adopted on 9 October 2008, article 4

[9] SESAR D5 - SESAR Master Plan (ref. DLM-0710-001-02-00, April 2008) §2.1.1; The achievement of theses performances will be assessed against key performance indicators defined for the SESAR programme and derived from the ICAO standards. Examples: Annual IFR flight in Europe (capacity); total annual en-route (cost effectiveness); scheduled flights departing on time (efficiency). There are other Key Performance Indicators to assess flexibility, predictability, safety and environmental sustainability (see D5 §2.1)

- Associated improvement in safety so that the total number of ATM induced accidents and serious or risk bearing incidents will not increase despite traffic growth;

- 10% reduction per flight in environmental impact compared to 2005; and

- 50% reduction in cost per flight compared to 2004.

The SESAR contribution to the societal goals set by the Commission shall be continuously reviewed by the SESAR Joint Undertaking and kept up to date through the future versions of the ATM Master Plan.

2.3.2. Environment

With two major objectives in the environmental fields, the SESAR programme reflects the growth of the environmental pressure and of its importance within the ATM community. These objectives are:

- **To achieve emission improvements.** The SESAR target for 2020 is to achieve 10% fuel savings per flight as a result of ATM improvements alone, thereby enabling a 10% reduction of gas emissions per flight;

- **To improve the management of noise emissions and their impacts**: to ensure that these are minimized for each flight to the greatest extent possible;

Should the development phase conclude that ATM improvements on their own cannot fulfil the above objectives, the adequate coordination between SESAR and Clean Sky[10] would allow for the necessary trade-offs between the two initiatives, ensuring that, summing up their respective contributions, the environmental objectives would remain within reach. Any evolution in respect to the expected SESAR contribution to reducing environmental impact of air transport shall be reflected in the future versions of the ATM Master Plan.

2.3.3. Interoperability and standardisation

Interoperability is key to the success SESAR. Airspace users have clearly expressed their need to fly throughout the world with a single airborne equipment interoperable with any ground ATM system: SESAR in Europe, Nextgen in the United-States and any extension of theses two systems or any equivalent technological initiative in the other regions of the world[11].

Interoperability requires internationally agreed standards and norms. The SESAR development phase will deliver the technical ground for defining them. A standardisation roadmap shall be developed and kept up to date as a specific chapter of the ATM Master Plan. It will allow ATM stakeholders to anticipate and

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[10] Clean Sky is a Joint Technology Initiative that will develop breakthrough technologies to significantly improve the impact of air transport on the environment. More information available at http://www.cleansky.eu

[11] Outcome of the ICAO Forum on Integration and Harmonization of NextGen and SESAR into the Global ATM Framework, held in Montreal from 8 to 10 September 2008

coordinate their efforts to ease the adoption of SESAR technical proposals as standards and norms by the relevant standardisation bodies.

2.3.4. Deployment

The deployment phase of SESAR consists of a succession of three Implementation Packages coming with Operational Improvements. Implementation Packages deployment shall be supported by existing Community legal framework (Implementing Rules and Community Specifications). This will form a regulatory roadmap to be developed by the Commission and kept consistent with the ATM Master Plan.

Findings from the development phase as well as evolutions of the ATM stakeholders' needs require a continuous assessment of these Implementation Packages with the objective to consolidate the buy-in for all stakeholders.

Today, Implementation Package 1 is at stake. It delivers the baseline on which the subsequent Packages will build. The Operational Improvements it includes will be reviewed to guarantee they meet the most urgent expectations. Evolutions of Implementation Package 1 shall be captured through the updates of the ATM Master Plan.

2.3.5. Business case

The work of the SESAR definition phase in establishing the initial business case and cost benefit analysis must be continuously reviewed in the light of the evolutions of the ATM Master Plan. Moreover, an assessment of specific financing mechanisms for Implementation Package 1 is still required[12]. Specific business cases for military, unmanned aircraft, general aviation, business aviation, including very light jets, and helicopters also need to be developed.

Consolidation of the overall SESAR business case and development of specific business cases will have to be reflected in the future versions of the ATM Master Plan.

2.3.6. Risk management

The Council has invited the Commission to ensure that the Joint Undertaking puts in place a risk management process[13]. The SESAR Master Plan provides the basis for this risk management process with an early identification of the high level risks and associated mitigation actions.

With respect to service delivery, the high level risks are:

- The lack of homogeneity when deploying Implementation Package 1;
- The lack of governance in the deployment phase leading to unsuccessful deployment of Implementation Packages 2 and 3;

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12 Non repayable grants, deferral of the depreciation charges, financial incentives

13 Council Resolution on SESAR development adopted on 9th October 2008, article 9

- The lack of investment into SESAR by the key stakeholders;
- Failure and/or delays to develop or validate the advanced technologies required to support the new ATM concept;
- Failure and/or delays to implement the System Wide Information Management system.

With respect to institutional and management issues, the high level risks are:

- The insufficient support from the regulatory framework to the deployment process;
- The failure to manage human resources in time of changes;
- The absence or late defragmentation of the European airspace.

In order to efficiently manage these risks, more than 40 mitigation actions have been identified, out of which more than 25 have already been undertaken with significant risks reduction expected since 2009[14]. Each update of the ATM Master Plan shall include a review of the high priority risks and associated mitigation actions**.**

2.4. Endorsing the SESAR Master Plan as the ATM Master Plan

In the light of the above assessment, the Commission proposes the Council to endorse the SESAR Master Plan as the ATM Master Plan[15]. The endorsement of the SESAR Master Plan as the initial ATM Master Plan does not imply commitment of Member States further than the ones stated in the Council Resolution on the launch of the development phase of the SESAR programme[16].

3. ATM MASTER PLAN MANAGEMENT

As the Master Plan is an evolving document, the process to adopt its future updates shall be agreed. This is even more important because updates of the ATM Master Plan shall be adopted by the Administrative Board of the SESAR Joint Undertaking[17].

3.1. Towards the first adoption of the ATM Master Plan

The whole process starts with the Council's endorsement of the SESAR Master Plan as the initial ATM Master Plan. Then, the following steps shall be followed:

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14 SESAR D5 - SESAR Master Plan (ref. DLM-0710-001-02-00, April 2008) §5

15 As required by article 1.2 of the Council Regulation No 219/2007 of 27 February 2007 on the establishment of the SESAR Joint Undertaking

16 Council Resolution on SESAR development adopted on 9th October 2008

17 Council Regulation No 219/2007 of 27 February 2007, Annex article 5.1.a

- The Commission communicates the ATM Master Plan to the European Parliament for its information[18];

- The Commission informs the SESAR Joint Undertaking about the endorsement of the ATM Master Plan;

- The Administrative Board adopts the ATM Master Plan previously endorsed by the Council[19].

3.2. ATM Master Plan lifecycle

With the adoption of the ATM Master Plan by the Administrative Board, the Joint Undertaking shall obtain the required basis to set up its work programme.

The ATM Master Plan then enters into its regular lifecycle where the SESAR Joint Undertaking is in charge of managing the ATM Master Plan. Each time a significant[20] update of the ATM Master Plan is ready for examination by the Administrative Board[21], the following steps shall be followed:

- When a significant change of the ATM Master Plan is ready for examination by the Administrative Board, it is forwarded to all its members, including the Commission.

- The update of the ATM Master Plan, as proposed by SESAR Joint Undertaking, shall be presented by the Commission to the Single Sky Committee aiming at adoption of a Community position on this proposal[22]. Through this consultation that the Member States continue to exercise their control over the ATM Master Plan and its execution.

- The Community position shall be voiced by the Commission at the Administrative Board when voting the adoption of an update of the ATM Master Plan[23].

4. IMPLEMENTATION OF THE ATM MASTER PLAN

The SESAR Joint Undertaking is in charge of implementing the ATM Master Plan[24].

The Commission shall provide the Council and the European Parliament with regular reports on the progress of the JU in implementing the ATM Master Plan[25].

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18 Council Regulation No 219/2007 of 27 February 2007, article 1.3

19 Council regulation No 219/2007 of 27 February 2007, annex article 5.1.a

20 A significant change means a change that has an impact on investments (costs), performance (benefits) or timescales. Non significant changes are dealt with by the SESAR Joint Undertaking internally. The process to be applied for non significant updates is out of the scope of this Communication

21 As part of its work programme, the SESAR Joint Undertaking has developed a work-package fully dedicated to ATM Master Plan maintenance (WP C). This work-package is compliant with the high level processes described in the present Communication

22 Council Regulation No 219/2007 of 27 February 2007, article 5.4 and Council Decision No 1999/468/CE of 28 June 1999

23 Council Regulation No 219/2007 of 27 February 2007, Annex article 4.6

24 Council Regulation No 219/2007 of 27 February 2007, article 1.5 and Council Resolution on SESAR development adopted on 9th October 2008, article 9

The Commission shall also monitor the consistency with the ICAO Global Implementation Plan.

5. CONCLUSION

The ATM Master Plan is a key element for the implementation of the Single European Sky. Its endorsement will accelerate the urgently required technological evolution of the present ATM systems to support the new SESAR ATM concept and its key contributions to the societal goals of the Single European Sky.

The Commission invites the Council to endorse the SESAR Master Plan as the initial ATM Master Plan together with the procedure for updating the ATM Master Plan.

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[25] Council Regulation No 219/2007 of 27 February 2007, article 3

ANNEX A

THE ATM MASTER PLAN OVERVIEW: SESAR IMPLEMENTATION PACKAGES AND SERVICE LEVELS

The overall plan for the development and deployment of SESAR and its corresponding network is illustrated in Figure 1 below.

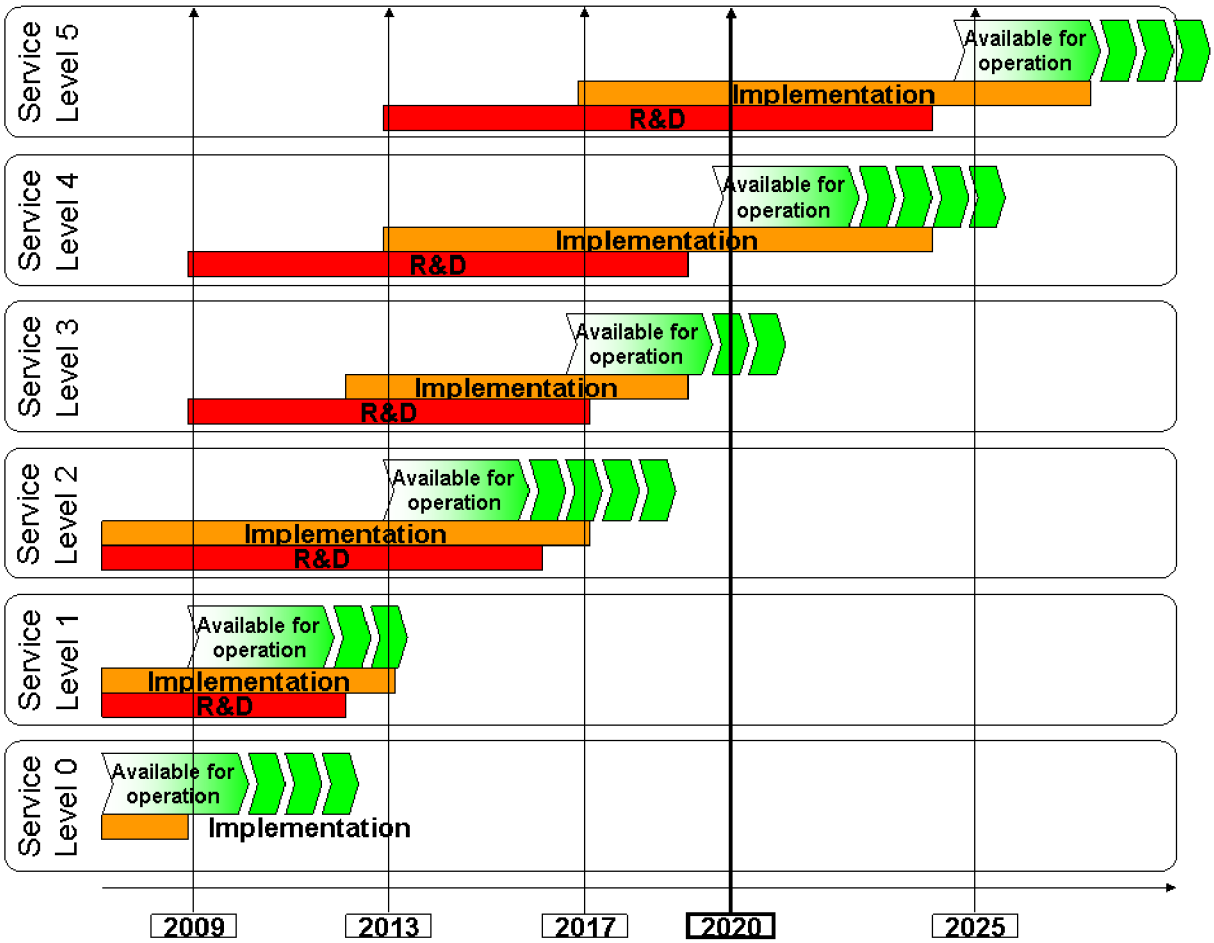

Figure 1 - Master Plan Overview

Services levels 0 to 5 are shortly described in the table below.

Service levels	0	1	2	3	4	5
Key achievements	Rolling out best practises	Preparing trajectory based operations	Implementing net-centric trajectory management	Achieving advanced automation on a shared trajectory environment	Extending operations with advanced separation modes	Accommodating full 4 dimension trajectory management based on user preferred routes
Key dates[26]	Now / 2012	2009 / 2013	2013 / 2019	2017 / 2020	2020/2025	From 2025
Examples of operational improvements[27]	Continuous descent approach Flexible air traffic control sectors Continuous climb departure Initial data-link Automatic flight conformance monitoring Basic departure management Arrival management Ground based safety nets Runway occupancy time optimisation techniques	Interactive rolling network operations plan Manual user driven prioritisation process Arrival/departure management integration Airborne traffic awareness in flight and on ground Airborne and on ground traffic separation Improved low visibility procedure	Full set of complexity management tools Airborne spacing, sequencing and merging 2 dimension precision trajectory clearances on pre-defined routes Automatic surface movement planning and routing Separation adjustment based on wake vortex detection	Dynamic terminal areas and flexible military areas Dynamic air traffic flow management using reference business trajectory Dynamic reference business trajectory revision using data-link 2 dimension precision trajectory clearances on user preferred routes 3 dimension precision trajectory clearances on pre-defined routes Full set of advanced controllers tools Automatic airborne separation	Dynamic mobile areas Free routing outside terminal areas 3 dimension precision trajectory clearances on user preferred routes Delegation of the separation 1 to 1 aircraft for crossing/passing manoeuvres Advanced safety nets with full compatibility between ground based and airborne tools Use of synthetic vision in low visibility conditions Remotely controlled aerodrome	Real time adaptation of air traffic control sectors Aircraft spacing self adjustment based on wake vortex detection Delegation of the separation 1 to several aircraft 4 dimension precision trajectory clearances on user preferred routes

Table 1: overview of SESAR service levels 0 to 5

26 Two dates are presented for each service level. The first date means some features of the service level are available in some specific areas. The second date means full service level is available in most areas.

27 Refer to SESAR D5 - SESAR Master Plan (ref. DLM-0710-001-02-00, April 2008) §3 for full list of operational improvements arranged by lines of changes